

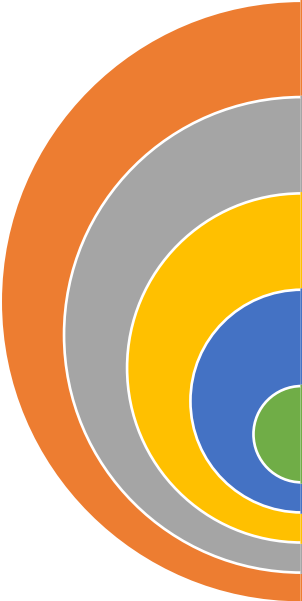
# Project Report

## “A Firefighter Robot”

Course Title: Embedded System

Course Code: CSE-423

Presented by: **SILICON**



Submitted To:
Mosharraf Hossain Khan
Senior Lecturer
Department of CSE
Daffodil International University

Submitted By:

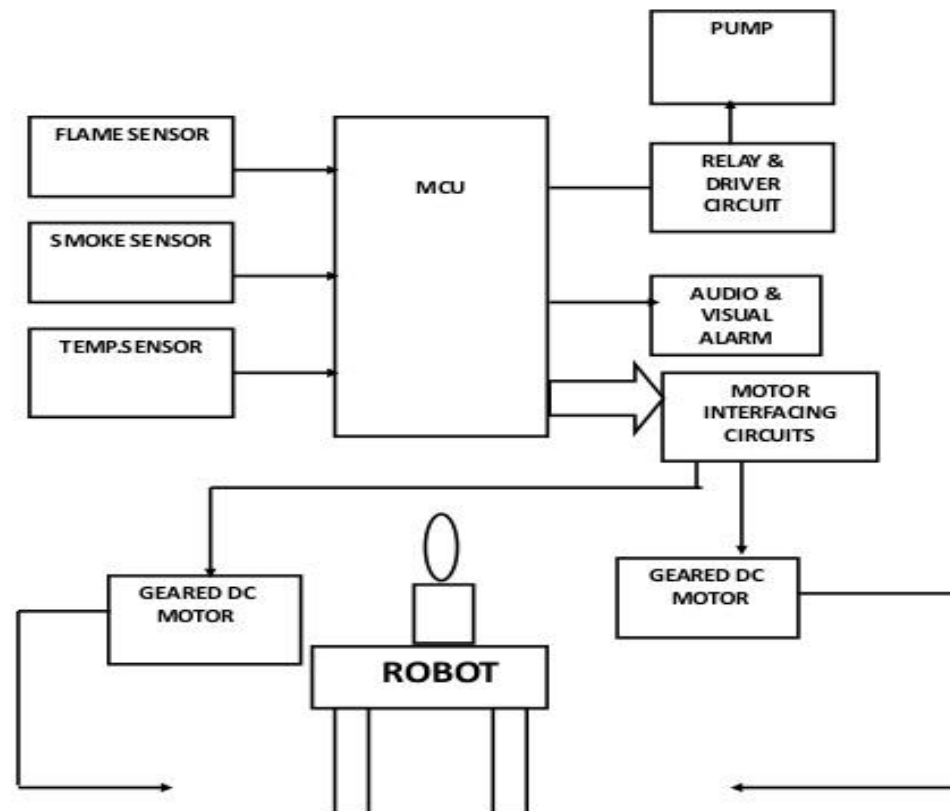
Name	ID	Section
Md Sabbir Alam Pran	171-15-9267	O-6
Ali Abrar Al Haque	171-15-8632	O-6
Md. Takveer Ahmed	171-15-8633	O-6
Ebrahim Khan	171-15-8885	O-6
Tafsirul Ahsan	171-15-8661	O-6

## Introduction:

*A Firefighting is an important job but it is very dangerous occupation. Due to that, Robots are designed to find a fire, before it rages out of control. It could be used to work with fire fighters to reduce the risk of injury to victims.*

The firefighter Robot will detect fire automatically after being sent to the Accident Zone. Then after detecting, it will put out the fire immediately using water.

**BLOCK DIAGRAM**



### Component with the price

Arduino UNO

Fire sensor or Flame sensor (3 Nos)

Servo Motor (SG90)

I298 motor Driver module

Mini DC Submersible Pump

Small Breadboard

Robot chassis with motors (2) and wheels(2) (any type)

A small can

Connecting wires

**INVOICE # 31401****Order Details****Electronics.Com.BD**

Shop 463, 3rd Floor, Farm view  
Supper Market, Farmget,  
Dhaka 1215, Bangladesh  
Email : info@electronics.com.bd  
Telephone 01919646416  
E-Mail  
electronics.com.bd@gmail.com  
Web Site:  
<https://www.electronics.com.bd>

**Store Information**

Date Added 12/08/2020  
Order ID: 31401  
Payment Method Cash On  
Delivery  
Shipping Method Flat Shipping  
Rate

**Shipping Address1**

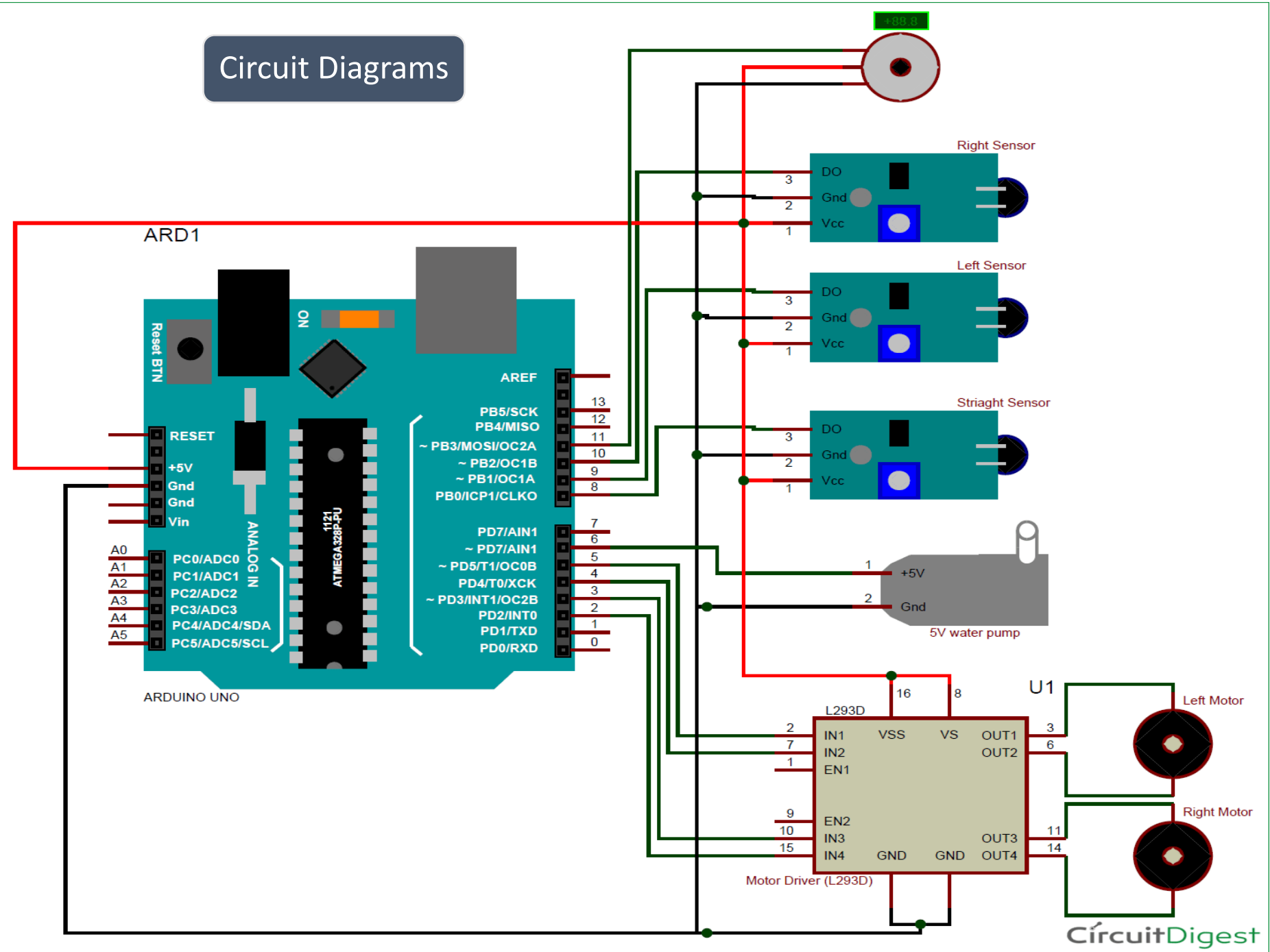
Sabbir Alam  
01686716411  
Bangladesh Air Force Gate,  
Balughat, Dhaka Cantonment ,  
Dhaka-1206  
Dhaka District  
Bangladesh  
Total : **৳860.72**

**Product**

Product	Model	Quantity	Unit Price	Total
1-Channel Flame Sensor Module for Arduino	0873	3	৳45.84	৳137.52
WATER PUMPS MINI SUBMERSIBLE WITH HOSE PIPE (1Meter)	2988	1	৳171.90	৳171.90
Breadboard/Project Board - Mini Modular (Red)	0511	1	৳34.38	৳34.38
Robotic Chassis Two Wheel	0294	1	৳446.93	৳446.93
Sub-Total				৳790.72
Handling/Packing Fee				৳15.00
Flat Shipping Rate				৳55.00
Total				৳860.72



# Circuit Diagrams



## Sketch(01)

```
#include <Servo.h>
Servo myservo;

int pos = 0;
boolean fire = false;

/*-----defining Inputs-----*/
#define Left_S 9    // left sensor
#define Right_S 10  // right sensor
#define Forward_S 8 //forward sensor

/*-----defining Outputs-----*/
#define LM1 2    // left motor
#define LM2 3    // left motor
#define RM1 4    // right motor
#define RM2 5    // right motor
#define pump 6

void setup()
{
  pinMode(Left_S, INPUT);
  pinMode(Right_S, INPUT);
  pinMode(Forward_S, INPUT);
  pinMode(LM1, OUTPUT);
  pinMode(LM2, OUTPUT);
  pinMode(RM1, OUTPUT);
  pinMode(RM2, OUTPUT);
  pinMode(pump, OUTPUT);
```

```
myservo.attach(11);
myservo.write(90);
}

void put_off_fire()
{
  delay (500);

  digitalWrite(LM1, HIGH);
  digitalWrite(LM2, HIGH);
  digitalWrite(RM1, HIGH);
  digitalWrite(RM2, HIGH);

  digitalWrite(pump, HIGH);
  delay(500);

  for (pos = 50; pos <= 130; pos += 1) {
    myservo.write(pos);
    delay(10);
  }
  for (pos = 130; pos >= 50; pos -= 1) {
    myservo.write(pos);
    delay(10);
  }

  digitalWrite(pump, LOW);
  myservo.write(90);

  fire = false;
}
```

## Sketch(02)

```
void loop()
{
  myservo.write(90); //Sweep_Servo();

  //If Fire not detected all sensors are zero
  if (digitalRead(Left_S) == 1 && digitalRead(Right_S) == 1 && digitalRead(Forward_S) == 1)
  {
    //Do not move the robot
    digitalWrite(LM1, HIGH);
    digitalWrite(LM2, HIGH);
    digitalWrite(RM1, HIGH);
    digitalWrite(RM2, HIGH);
  }

  else if (digitalRead(Forward_S) == 0) //If Fire is straight ahead
  {
    //Move the robot forward
    digitalWrite(LM1, HIGH);
    digitalWrite(LM2, LOW);
    digitalWrite(RM1, HIGH);
    digitalWrite(RM2, LOW);
    fire = true;
  }
```

```
else if (digitalRead(Left_S) == 0) //If Fire is to the left
{
  //Move the robot left
  digitalWrite(LM1, HIGH);
  digitalWrite(LM2, LOW);
  digitalWrite(RM1, HIGH);
  digitalWrite(RM2, HIGH);
}

else if (digitalRead(Right_S) == 0) //If Fire is to the right
{
  //Move the robot right
  digitalWrite(LM1, HIGH);
  digitalWrite(LM2, HIGH);
  digitalWrite(RM1, HIGH);
  digitalWrite(RM2, LOW);
}
```



## Description

Sense the body temperature.

Arduio motor will signal the driver through i298 motor driver

Motor will stop at fireplace by delay function

Then pump and servo motor will be activated, it will throw water and hold, stop when necessary

The output from this circuit is fed to RAO of the MCU for further procedures.

### ADVANTAGES

The fire detecting robot helps in following ways:

- To detect the exact direction of the fire source.
- Capability of sensing accurately with increased flexibility.
- Reduce human effort.
- Reliable and economical.
- Not sensitive to weather conditions.

### DISADVANTAGES

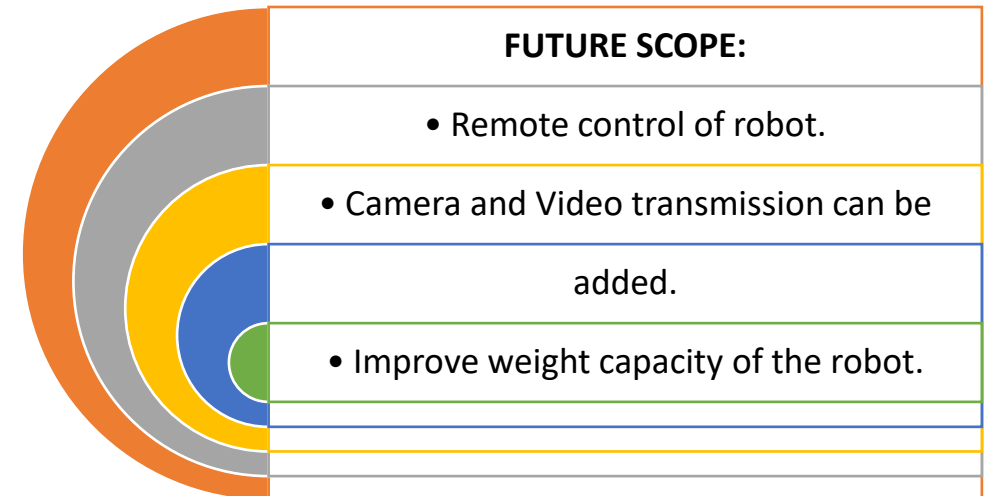
- No monitoring system for the vehicle.
- No remote control for the robotic movement.
- Our system used only for less than 3.5Kg application.
- It is not used to put out large fires.

## Conclusion

- Here we successfully developed the **FIRE**

### **EXTINGUISHER Robot.**

- Robot detects temperature, smoke and flame at the site where the robot exists.
- The movement of this robot vehicle is controlled by MCU as per the program.
- This robot is help full in those areas where natural calamity and bomb explosions where occurred.
- If fire is detected with the help of sensors, MCU operates the water pump mechanism through relay circuit.



**Thank You**